



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 15, 2023 – 08:56 PM EDT

PDB ID : 1TFV  
Title : CRYSTAL STRUCTURE OF A BUFFALO SIGNALING GLYCOPROTEIN (SPB-40) SECRETED DURING INVOLUTION  
Authors : Bilgrami, S.; Saravanan, K.; Yadav, S.; Kaur, P.; Srinivasan, A.; Singh, T.P.  
Deposited on : 2004-05-27  
Resolution : 2.90 Å (reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35

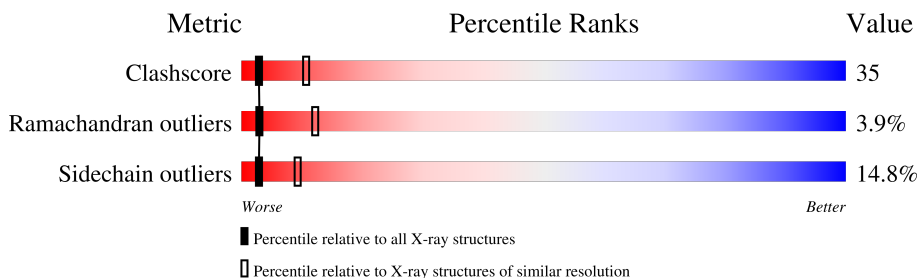
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.90 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ .

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	361	
2	B	2	

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 2986 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called mammary gland protein 40.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	361	2894	1851	507	527	9	0	0	0

- Molecule 2 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	B	2	28	16	2	10	0	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	64	Total	O	0	0
			64	64		

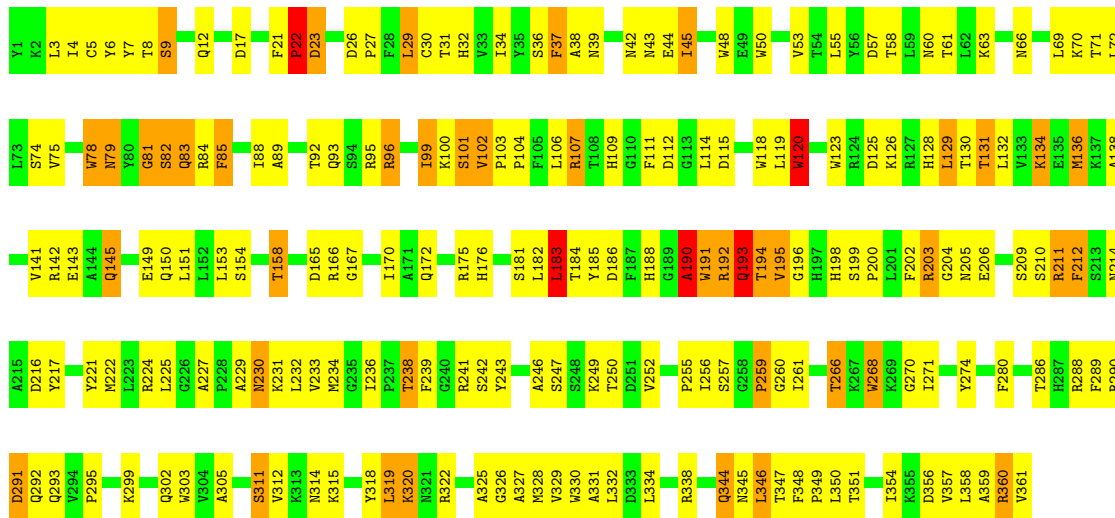
### 3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

Note EDS was not executed.

- Molecule 1: mammary gland protein 40

Chain A: 



- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain B: 



## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	62.76Å 66.56Å 107.14Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.90	Depositor
% Data completeness (in resolution range)	100.0 (20.00-2.90)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.17	Depositor
Refinement program	REFMAC 5.1.19	Depositor
R, $R_{free}$	0.237 , 0.288	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	2986	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	42.0	wwPDB-VP

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: NAG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.59	1/2974 (0.0%)	0.92	14/4037 (0.3%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	78	TRP	CB-CG	7.87	1.64	1.50

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	191	TRP	N-CA-C	9.97	137.93	111.00
1	A	129	LEU	CA-CB-CG	7.86	133.37	115.30
1	A	268	TRP	CA-CB-CG	7.34	127.65	113.70
1	A	81	GLY	O-C-N	6.60	133.27	122.70
1	A	259	PRO	N-CA-C	6.27	128.41	112.10
1	A	191	TRP	C-N-CA	-6.24	106.09	121.70
1	A	22	PRO	CA-N-CD	-6.07	103.00	111.50
1	A	193	GLN	N-CA-C	5.91	126.94	111.00
1	A	190	ALA	C-N-CA	-5.73	107.36	121.70
1	A	319	LEU	CA-CB-CG	5.57	128.12	115.30
1	A	81	GLY	CA-C-N	-5.42	105.29	117.20
1	A	268	TRP	CB-CA-C	-5.26	99.89	110.40
1	A	82	SER	C-N-CA	5.23	134.76	121.70
1	A	78	TRP	CA-CB-CG	5.07	123.34	113.70

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2894	0	2818	198	0
2	B	28	0	26	4	0
3	A	64	0	0	8	0
All	All	2986	0	2844	199	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 35.

All (199) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:39:ASN:HD21	2:B:1:NAG:C1	1.08	1.53
1:A:252:VAL:HG21	1:A:289:PHE:CE1	1.91	1.05
1:A:44:GLU:HG3	1:A:101:SER:HB2	1.37	1.04
1:A:45:ILE:HG21	1:A:102:VAL:HG23	1.41	0.99
1:A:203:ARG:HH12	1:A:216:ASP:HB3	1.29	0.98
1:A:203:ARG:HD2	1:A:211:ARG:HE	1.27	0.96
1:A:203:ARG:HD2	1:A:211:ARG:NE	1.83	0.92
1:A:37:PHE:HA	1:A:74:SER:O	1.69	0.91
1:A:6:TYR:HB2	1:A:330:TRP:O	1.71	0.90
1:A:75:VAL:HG23	1:A:114:LEU:HD11	1.53	0.88
1:A:75:VAL:CG2	1:A:114:LEU:HD11	2.03	0.88
1:A:212:PHE:HA	1:A:217:TYR:HD1	1.38	0.87
1:A:45:ILE:CG2	1:A:102:VAL:HG23	2.04	0.87
1:A:288:ARG:HD3	3:A:396:HOH:O	1.74	0.87
1:A:212:PHE:HA	1:A:217:TYR:CD1	2.11	0.85
1:A:183:LEU:O	1:A:186:ASP:HB2	1.80	0.82
1:A:259:PRO:O	1:A:270:GLY:HA2	1.80	0.82
1:A:252:VAL:HG21	1:A:289:PHE:CZ	2.15	0.80
1:A:320:LYS:HE2	1:A:361:VAL:OXT	1.83	0.79
1:A:252:VAL:CG2	1:A:289:PHE:CE1	2.66	0.78
1:A:142:ARG:O	1:A:145:GLN:HG3	1.84	0.78
1:A:96:ARG:HB3	3:A:419:HOH:O	1.83	0.78
1:A:99:ILE:HG22	1:A:100:LYS:N	1.97	0.77
1:A:99:ILE:HG13	1:A:136:MET:CE	2.13	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:266:THR:HG23	1:A:268:TRP:HD1	1.49	0.77
1:A:331:ALA:HB3	1:A:334:LEU:HD12	1.68	0.76
1:A:312:VAL:HG11	1:A:354:ILE:HD11	1.67	0.75
1:A:8:THR:HA	1:A:36:SER:HB2	1.69	0.75
1:A:96:ARG:HD2	3:A:419:HOH:O	1.87	0.74
1:A:120:TRP:CE3	1:A:120:TRP:N	2.56	0.74
1:A:99:ILE:HG13	1:A:136:MET:HE2	1.68	0.74
1:A:182:LEU:HD21	1:A:222:MET:HG3	1.68	0.74
1:A:203:ARG:NH1	1:A:216:ASP:HB3	2.02	0.74
1:A:252:VAL:HG21	1:A:289:PHE:HE1	1.52	0.74
1:A:53:VAL:HG12	1:A:109:HIS:HE1	1.52	0.74
1:A:150:GLN:HG2	1:A:151:LEU:O	1.89	0.73
1:A:103:PRO:HB2	1:A:104:PRO:HD3	1.71	0.73
1:A:266:THR:HG23	1:A:268:TRP:CD1	2.23	0.73
1:A:21:PHE:C	1:A:23:ASP:H	1.92	0.72
1:A:99:ILE:HA	1:A:136:MET:CE	2.21	0.70
1:A:4:ILE:HD12	1:A:4:ILE:N	2.07	0.69
1:A:252:VAL:CG2	1:A:289:PHE:HE1	2.02	0.69
1:A:7:TYR:CZ	1:A:22:PRO:HD3	2.28	0.68
1:A:192:ARG:NE	1:A:192:ARG:HA	2.09	0.68
1:A:44:GLU:HG3	1:A:101:SER:CB	2.21	0.67
1:A:236:ILE:HG21	1:A:312:VAL:HG13	1.75	0.67
1:A:203:ARG:HH12	1:A:216:ASP:CB	2.05	0.67
1:A:356:ASP:O	1:A:360:ARG:HD2	1.95	0.67
1:A:74:SER:HA	1:A:115:ASP:O	1.95	0.66
1:A:200:PRO:HB3	1:A:292:GLN:HG2	1.77	0.66
1:A:238:THR:HG21	1:A:331:ALA:O	1.95	0.66
1:A:190:ALA:HB2	3:A:389:HOH:O	1.96	0.66
1:A:202:PHE:HB2	1:A:291:ASP:O	1.95	0.66
1:A:120:TRP:HH2	1:A:183:LEU:HG	1.62	0.65
1:A:312:VAL:CG1	1:A:354:ILE:HD11	2.26	0.65
1:A:63:LYS:HG3	1:A:69:LEU:HD12	1.78	0.64
1:A:242:SER:OG	1:A:260:GLY:HA3	1.97	0.64
1:A:3:LEU:HD22	1:A:5:CYS:SG	2.36	0.64
1:A:34:ILE:HG12	1:A:72:LEU:HB2	1.80	0.64
1:A:319:LEU:HD11	1:A:327:ALA:HB2	1.80	0.64
1:A:39:ASN:CG	2:B:1:NAG:C1	2.64	0.63
1:A:118:TRP:CE3	1:A:129:LEU:HD13	2.33	0.63
1:A:120:TRP:HE3	1:A:120:TRP:H	1.45	0.63
1:A:192:ARG:HA	1:A:192:ARG:HE	1.63	0.62
1:A:45:ILE:HD13	1:A:102:VAL:CG2	2.29	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:81:GLY:HA3	1:A:83:GLN:NE2	2.15	0.62
1:A:118:TRP:HE3	1:A:129:LEU:HD13	1.64	0.62
1:A:247:SER:OG	1:A:255:PRO:HD2	1.99	0.62
1:A:120:TRP:CH2	1:A:183:LEU:HG	2.35	0.62
1:A:182:LEU:O	1:A:184:THR:N	2.32	0.61
1:A:95:ARG:HD2	1:A:132:LEU:HA	1.82	0.61
1:A:261:ILE:H	1:A:302:GLN:HE22	1.48	0.61
1:A:188:HIS:CD2	1:A:196:GLY:HA3	2.36	0.60
1:A:99:ILE:HG13	1:A:136:MET:HE1	1.85	0.59
1:A:259:PRO:O	1:A:270:GLY:CA	2.51	0.58
1:A:57:ASP:O	1:A:61:THR:HG23	2.03	0.58
1:A:39:ASN:ND2	2:B:1:NAG:C2	2.64	0.58
1:A:303:TRP:CZ3	1:A:305:ALA:HB2	2.38	0.58
1:A:3:LEU:O	1:A:30:CYS:HB3	2.04	0.57
1:A:22:PRO:HB2	1:A:58:THR:HG22	1.88	0.56
1:A:347:THR:HG22	3:A:400:HOH:O	2.06	0.56
1:A:26:ASP:HB3	1:A:29:LEU:HB2	1.88	0.55
1:A:188:HIS:H	1:A:198:HIS:HA	1.70	0.55
1:A:134:LYS:HG3	1:A:176:HIS:CD2	2.41	0.55
1:A:45:ILE:HG21	1:A:102:VAL:CG2	2.26	0.55
1:A:102:VAL:HG12	1:A:103:PRO:HD3	1.88	0.55
1:A:182:LEU:HB3	1:A:184:THR:HG23	1.89	0.55
1:A:45:ILE:HD13	1:A:102:VAL:HG21	1.88	0.54
1:A:211:ARG:HG2	1:A:211:ARG:HH21	1.72	0.54
1:A:4:ILE:HD12	1:A:4:ILE:H	1.72	0.54
1:A:243:TYR:HB3	1:A:256:ILE:CD1	2.38	0.54
1:A:112:ASP:CG	3:A:412:HOH:O	2.47	0.53
1:A:243:TYR:HB3	1:A:256:ILE:HD12	1.90	0.53
1:A:195:VAL:HG13	1:A:303:TRP:CZ2	2.42	0.53
1:A:63:LYS:HG2	1:A:69:LEU:O	2.08	0.53
1:A:4:ILE:N	1:A:4:ILE:CD1	2.72	0.53
1:A:37:PHE:CA	1:A:74:SER:O	2.52	0.53
1:A:66:ASN:ND2	1:A:69:LEU:HB2	2.24	0.53
1:A:303:TRP:HZ3	1:A:305:ALA:HB2	1.74	0.52
1:A:138:ALA:O	1:A:141:VAL:HG12	2.09	0.52
1:A:107:ARG:HD3	1:A:143:GLU:OE2	2.09	0.52
1:A:319:LEU:CD1	1:A:327:ALA:HB2	2.38	0.52
1:A:203:ARG:CD	1:A:211:ARG:HE	2.11	0.52
1:A:204:GLY:C	1:A:206:GLU:H	2.12	0.52
1:A:212:PHE:CD1	1:A:217:TYR:CE1	2.98	0.52
1:A:4:ILE:H	1:A:4:ILE:CD1	2.22	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:202:PHE:HD1	1:A:203:ARG:NH2	2.07	0.52
1:A:45:ILE:CD1	1:A:102:VAL:HG21	2.41	0.51
1:A:115:ASP:OD1	1:A:154:SER:OG	2.29	0.51
1:A:290:ARG:O	1:A:293:GLN:HG3	2.10	0.51
1:A:21:PHE:O	1:A:23:ASP:N	2.45	0.50
1:A:360:ARG:O	1:A:361:VAL:HG23	2.11	0.50
1:A:318:TYR:CE2	1:A:322:ARG:HD2	2.46	0.50
1:A:149:GLU:HG3	3:A:385:HOH:O	2.11	0.50
1:A:45:ILE:CB	1:A:102:VAL:HG23	2.42	0.50
1:A:211:ARG:O	1:A:214:ASN:ND2	2.45	0.50
1:A:238:THR:CG2	1:A:334:LEU:HB2	2.42	0.50
1:A:131:THR:HA	1:A:134:LYS:HB2	1.93	0.49
1:A:5:CYS:HB3	1:A:332:LEU:HG	1.92	0.49
1:A:181:SER:HB3	1:A:328:MET:CE	2.41	0.49
1:A:239:PHE:HE2	1:A:241:ARG:HE	1.61	0.49
1:A:261:ILE:HG12	1:A:302:GLN:NE2	2.27	0.49
1:A:3:LEU:CD2	1:A:5:CYS:SG	3.00	0.49
1:A:185:TYR:HA	1:A:199:SER:HB3	1.94	0.49
1:A:238:THR:O	1:A:274:TYR:HB2	2.13	0.49
1:A:209:SER:O	1:A:210:SER:OG	2.30	0.48
2:B:1:NAG:HO4	2:B:2:NAG:C1	2.16	0.48
1:A:21:PHE:C	1:A:23:ASP:N	2.65	0.48
1:A:252:VAL:CG2	1:A:289:PHE:CZ	2.90	0.48
1:A:191:TRP:O	1:A:192:ARG:C	2.45	0.48
1:A:320:LYS:HE3	1:A:357:VAL:O	2.14	0.47
1:A:202:PHE:CD1	1:A:203:ARG:NH2	2.82	0.47
1:A:234:MET:CE	1:A:315:LYS:HB3	2.44	0.47
1:A:331:ALA:HB3	1:A:334:LEU:CD1	2.41	0.47
1:A:136:MET:HB3	1:A:153:LEU:HD22	1.95	0.47
1:A:252:VAL:HG11	3:A:377:HOH:O	2.14	0.47
1:A:126:LYS:HB2	1:A:167:GLY:HA2	1.96	0.47
1:A:5:CYS:HB3	1:A:332:LEU:CG	2.45	0.46
1:A:9:SER:O	1:A:12:GLN:HG2	2.15	0.46
1:A:311:SER:O	1:A:315:LYS:HG3	2.15	0.46
1:A:123:TRP:HB3	1:A:166:ARG:HG3	1.97	0.46
1:A:130:THR:O	1:A:134:LYS:HB2	2.16	0.46
1:A:288:ARG:HA	1:A:295:PRO:HA	1.98	0.46
1:A:195:VAL:HG13	1:A:303:TRP:CH2	2.50	0.46
1:A:134:LYS:HG3	1:A:176:HIS:NE2	2.31	0.45
1:A:348:PHE:N	1:A:349:PRO:HD3	2.31	0.45
1:A:42:ASN:O	1:A:44:GLU:N	2.49	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:120:TRP:CZ2	1:A:158:THR:HB	2.52	0.45
1:A:172:GLN:O	1:A:175:ARG:HG2	2.16	0.45
1:A:120:TRP:N	1:A:120:TRP:CD2	2.81	0.45
1:A:85:PHE:HB3	1:A:118:TRP:CE2	2.52	0.44
1:A:238:THR:HA	1:A:350:LEU:HD23	1.98	0.44
1:A:188:HIS:HE1	1:A:194:THR:O	2.00	0.44
1:A:12:GLN:NE2	1:A:55:LEU:HD11	2.32	0.44
1:A:53:VAL:HG12	1:A:109:HIS:CE1	2.42	0.44
1:A:359:ALA:C	1:A:361:VAL:H	2.21	0.44
1:A:79:ASN:N	1:A:79:ASN:OD1	2.50	0.43
1:A:106:LEU:HG	1:A:111:PHE:HB2	2.00	0.43
1:A:102:VAL:HG11	1:A:114:LEU:HD22	2.00	0.43
1:A:344:GLN:C	1:A:346:LEU:H	2.22	0.43
1:A:17:ASP:HA	1:A:338:ARG:HE	1.83	0.43
1:A:60:ASN:ND2	1:A:71:THR:OG1	2.50	0.43
1:A:230:ASN:C	1:A:325:ALA:HB2	2.38	0.43
1:A:312:VAL:HG11	1:A:354:ILE:CD1	2.43	0.43
1:A:22:PRO:HB2	1:A:58:THR:CG2	2.48	0.43
1:A:329:VAL:HG21	1:A:351:THR:HG23	2.01	0.43
1:A:246:ALA:HB2	1:A:257:SER:N	2.34	0.43
1:A:120:TRP:CE3	1:A:120:TRP:CA	3.02	0.42
1:A:170:ILE:CG2	1:A:227:ALA:HB2	2.48	0.42
1:A:204:GLY:HA3	1:A:292:GLN:NE2	2.34	0.42
1:A:188:HIS:CE1	1:A:194:THR:O	2.72	0.42
1:A:38:ALA:O	1:A:48:TRP:HE3	2.02	0.42
1:A:89:ALA:O	1:A:95:ARG:NH1	2.53	0.42
1:A:233:VAL:HA	1:A:326:GLY:O	2.20	0.42
1:A:280:PHE:O	1:A:299:LYS:CE	2.68	0.42
1:A:125:ASP:O	1:A:128:HIS:N	2.47	0.42
1:A:312:VAL:CG1	1:A:354:ILE:CD1	2.98	0.42
1:A:221:TYR:CZ	1:A:225:LEU:HD21	2.55	0.42
1:A:247:SER:C	1:A:249:LYS:N	2.73	0.42
1:A:204:GLY:C	1:A:206:GLU:N	2.73	0.41
1:A:165:ASP:OD1	1:A:221:TYR:OH	2.29	0.41
1:A:181:SER:HB3	1:A:328:MET:HE2	2.00	0.41
1:A:37:PHE:H	1:A:74:SER:HB3	1.85	0.41
1:A:195:VAL:CG1	1:A:303:TRP:CZ2	3.03	0.41
1:A:256:ILE:HD13	1:A:256:ILE:HA	1.90	0.41
1:A:211:ARG:HH21	1:A:211:ARG:CG	2.34	0.41
1:A:212:PHE:CD1	1:A:217:TYR:HE1	2.39	0.41
1:A:229:ALA:O	1:A:231:LYS:N	2.54	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:32:HIS:HA	1:A:70:LYS:O	2.20	0.41
1:A:247:SER:C	1:A:249:LYS:H	2.24	0.41
1:A:280:PHE:O	1:A:299:LYS:HE3	2.21	0.41
1:A:312:VAL:HG12	1:A:354:ILE:HG13	2.03	0.41
1:A:191:TRP:O	1:A:193:GLN:N	2.54	0.40
1:A:129:LEU:O	1:A:130:THR:C	2.60	0.40
1:A:31:THR:HG1	1:A:32:HIS:HD1	1.63	0.40
1:A:26:ASP:HA	1:A:27:PRO:HD3	1.85	0.40
1:A:93:GLN:H	1:A:93:GLN:HG2	1.60	0.40
1:A:318:TYR:CZ	1:A:322:ARG:HD2	2.57	0.40
1:A:102:VAL:O	1:A:103:PRO:C	2.60	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	359/361 (99%)	311 (87%)	34 (10%)	14 (4%)	<b>3</b>   <b>12</b>

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	43	ASN
1	A	190	ALA
1	A	193	GLN
1	A	230	ASN
1	A	205	ASN
1	A	29	LEU
1	A	183	LEU
1	A	212	PHE
1	A	345	ASN
1	A	22	PRO

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Mol	Chain	Res	Type
1	A	134	LYS
1	A	120	TRP
1	A	99	ILE
1	A	45	ILE

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	304/304 (100%)	259 (85%)	45 (15%)	<b>3</b> <b>9</b>

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	SER
1	A	22	PRO
1	A	23	ASP
1	A	37	PHE
1	A	50	TRP
1	A	78	TRP
1	A	79	ASN
1	A	82	SER
1	A	83	GLN
1	A	84	ARG
1	A	85	PHE
1	A	88	ILE
1	A	92	THR
1	A	96	ARG
1	A	101	SER
1	A	102	VAL
1	A	107	ARG
1	A	119	LEU
1	A	120	TRP
1	A	131	THR
1	A	136	MET
1	A	145	GLN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	158	THR
1	A	183	LEU
1	A	192	ARG
1	A	193	GLN
1	A	194	THR
1	A	195	VAL
1	A	203	ARG
1	A	211	ARG
1	A	224	ARG
1	A	232	LEU
1	A	238	THR
1	A	250	THR
1	A	266	THR
1	A	271	ILE
1	A	286	THR
1	A	291	ASP
1	A	311	SER
1	A	314	ASN
1	A	320	LYS
1	A	344	GLN
1	A	346	LEU
1	A	358	LEU
1	A	360	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	39	ASN
1	A	60	ASN
1	A	109	HIS
1	A	145	GLN
1	A	188	HIS
1	A	193	GLN
1	A	292	GLN
1	A	293	GLN
1	A	302	GLN
1	A	309	GLN
1	A	323	GLN
1	A	344	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates [i](#)

2 monosaccharides are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	NAG	B	1	2,1	14,14,15	0.62	0	17,19,21	1.49	1 (5%)
2	NAG	B	2	2	14,14,15	0.60	0	17,19,21	1.98	3 (17%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	B	1	2,1	-	3/6/23/26	0/1/1/1
2	NAG	B	2	2	-	4/6/23/26	0/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	2	NAG	O5-C1-C2	5.76	120.39	111.29
2	B	1	NAG	C2-N2-C7	5.30	130.44	122.90
2	B	2	NAG	C1-O5-C5	4.21	117.89	112.19
2	B	2	NAG	C2-N2-C7	-2.56	119.25	122.90

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	1	NAG	C8-C7-N2-C2
2	B	1	NAG	O7-C7-N2-C2
2	B	2	NAG	C4-C5-C6-O6
2	B	2	NAG	C8-C7-N2-C2
2	B	2	NAG	O7-C7-N2-C2
2	B	2	NAG	O5-C5-C6-O6
2	B	1	NAG	O5-C5-C6-O6

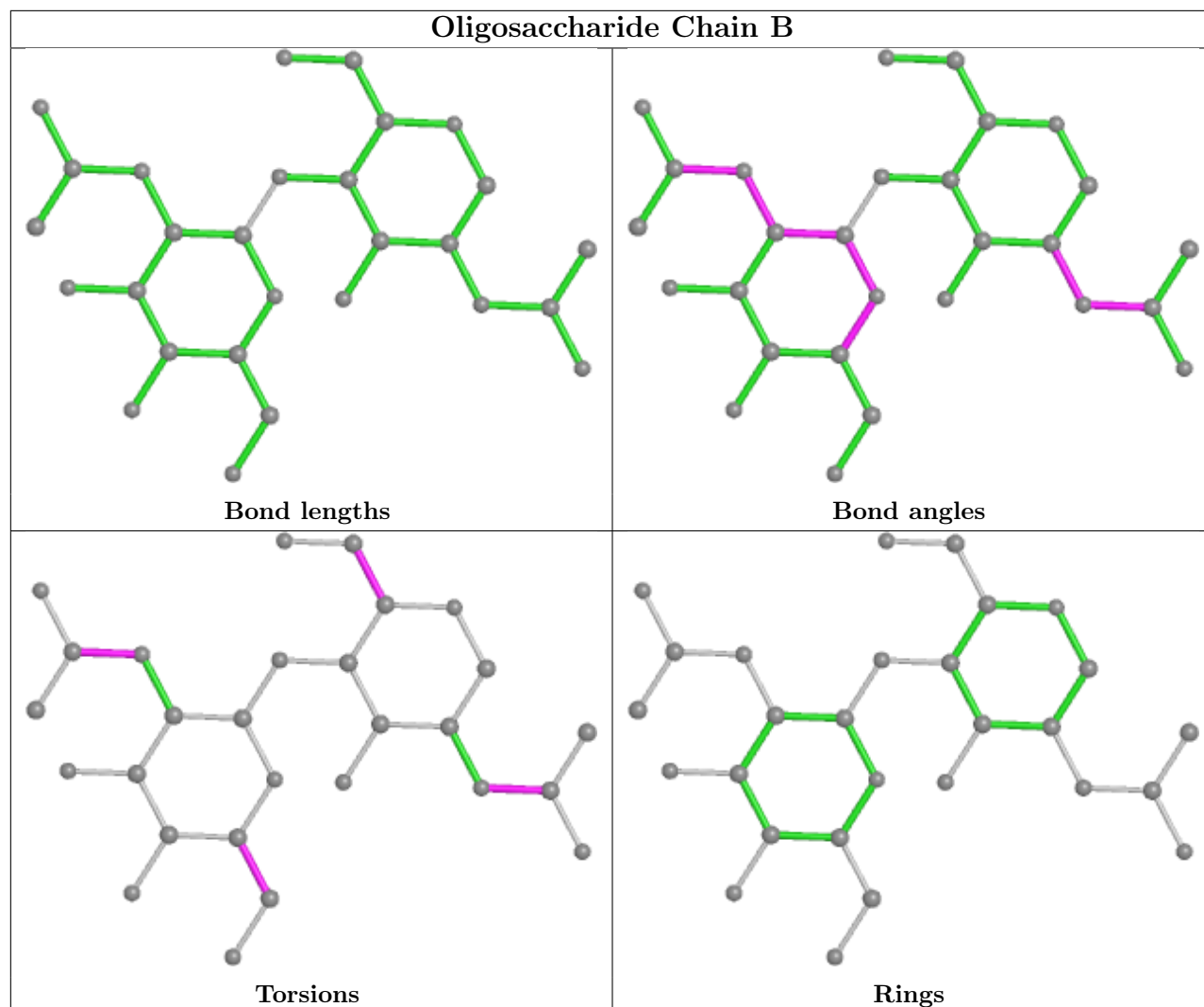
There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	2	NAG	1	0
2	B	1	NAG	4	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.





## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

### 6.4 Ligands

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers

EDS was not executed - this section is therefore empty.